

*Cherkasov A.S.*

AUTHORS: Nikitin, V.A. and Cherkasov, A.S.

51-1-5-27/29

TITLE: Infrared Spectra of Photooxides of Anthracene Derivatives.  
(Infra-krasnyye spektry fotooksidov proizvodnykh antratsena)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp.702-703 (USSR)

ABSTRACT: To elucidate the structure of photo-oxides of anthracene derivatives the authors measured infrared spectra of some compounds produced by photo-oxidation in  $H_2S$ . The samples were prepared by sublimation. On comparison of the spectra of photo-oxides and the original compounds in the region  $600-1800\text{ cm}^{-1}$  the authors concluded that: (1) the studied samples of photo-oxides of anthracene, 9-methylanthracene, 9,10-dimethylanthracene and 9,10-diphenylanthracene were obtained in pure form and did not contain noticeable amounts of the original compounds; (2) photo-oxides are not hydro-peroxides or hydroxy compounds; (3) photo-oxides, in contrast to the original compounds, have absorption bands in the regions  $800-900$  and  $1100-1300\text{ cm}^{-1}$  which are due to vibrations of the peroxide chain  $C-O-O-C$ . Comparison of the results given in a table on p. 703 with the results

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obtained for other peroxides (Ref 2) showed certain peculiarities in vibrations of the C—O—O—C in anthracene photo-oxides, which confirm the existence of an oxygen "bridge" outside the plane of photo-oxide molecules. The authors thank A.V. Karyakin who suggested this work. There are 1 table and 2 references, 1 of which is Soviet and 1 mixed (Western and Soviet);.

ASSOCIATION: Gosudarstvennyy Opticheskiy Institut imeni S.I. Vavilova  
(State Optical Institute im. S.I. Vavilov)

SUBMITTED: November 10, 1957

Card 2/2 1. Compounds - Spectrum analysis

AUTHORS:

Kudryashov, P. I.,

Cherkasov, A. S., Sveshnikov, B. Ya.,

Tishchenko, G. A.

S/170/59/002/10/010/020  
B115/B007

TITLE:

Organic Boron - Glycerin Luminophores

PERIODICAL:

Inzhenerno-fizicheskiy zhurnal, 1959, Vol 2, Nr 10,  
pp 62-64 (USSR)

ABSTRACT:

In the investigation of important rules of phosphorescence low-melting boric acid glasses activated with organic substances are used, which, however, have a number of disadvantages for the given purpose (Ref 1). In the present paper, an exceedingly simple method of producing phosphors of high optical quality is described. The fluorescence- and phosphorescence spectra of boric acid- and glycerin luminophores (Fig 1) agree practically with the spectra of other boron-containing phosphors. The main disadvantages of boron-glycerin luminophores are enumerated. There are 1 figure and 4 references, 2 of which are Soviet.



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AUTHORS: Vember, T.M. and Cherkasov, A.S.

SOV/51-6-2-17/39

TITLE: On Mutual Influence of Certain 9-Monoderivatives of Anthracene on Quantum Yields of Their Photochemical Transformations and on Quantum Yields of Fluorescence (O vzaimnom vliyanii nekotorykh 9-monoproizvodnykh antratsena na kvantovyye vykhody ikh fotokhimicheskikh prevrashcheniy i kvantovyye vykhody fluoresstentsii)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 2, pp 232-234 (USSR)

ABSTRACT: The authors reported earlier (Refs 1, 2) that monomesoalkyl derivatives of anthracene undergo photochemical reactions in solution, producing, in the presence of oxygen, two stable products: a photo-oxide and a photo-dimer. The authors also reported that increase of the concentration of the anthracene derivatives in solution increases the quantum yields of the photochemical reactions and decreases the quantum yield of fluorescence. The present paper deals with the situation when two or more anthracene derivatives are present in a solution. The question was whether (i) any one compound would behave simply as a foreign absorbing impurity or whether (ii) a mutual influence of one compound on another would be observed. The quantum yields of photo-oxidation,

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On Mutual Influence of Certain 9-Monoderivatives of Anthracene on Quantum Yields  
of Their Photochemical Transformations and on Quantum Yields of Fluorescence

photo-dimerization and fluorescence were determined for alcohol solution of the following mixtures: (1)  $3 \times 10^{-3}$  mole/litre of 9-methylantracene (MeA) and  $3 \times 10^{-3}$  mole/litre of 9-ethylantracene (EtA); (2)  $6 \times 10^{-3}$  mole/litre of MeA and  $6 \times 10^{-3}$  mole/litre of EtA; (3)  $3 \times 10^{-3}$  mole/litre MeA,  $3 \times 10^{-3}$  mole/litre EtA and  $3 \times 10^{-3}$  mole/litre 9-n-propylantracene (PrA); (4)  $6 \times 10^{-3}$  mole/litre MeA,  $6 \times 10^{-3}$  mole/litre EtA and  $6 \times 10^{-3}$  mole/litre PrA; (5)  $3 \times 10^{-3}$  mole/litre MeA and  $9 \times 10^{-3}$  mole/litre 9-acetoxyantracene (AcA); (6)  $6 \times 10^{-3}$  mole/litre MeA and  $6 \times 10^{-3}$  mole/litre AcA; (7)  $3 \times 10^{-3}$  mole/litre MeA and  $3 \times 10^{-3}$  mole/litre AcA. These solutions were illuminated with light of 365 mμ wavelength. At the concentrations used all incident light was absorbed in the solutions. These experiments were carried out at 20°C; they are described in greater detail by the authors in Ref 1. The experimental values of the quantum yields of photo-oxidation ( $\varphi_o$ ), photo-dimerization ( $\varphi_d$ ) and fluorescence (B) obtained by the authors are given in a table on p 233. This table quotes also the values of the three quantum yields calculated assuming either conditions (i) or

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of Their Photochemical Transformations and on Quantum Yields of Fluorescence

(ii). The data given in the table show clearly that, when more than one anthracene derivative is present in an alcohol solution, the quantum yields of the photochemical reactions increase and the quantum yield of fluorescence decreases, i.e. addition of one of these compounds to a solution is equivalent to increase of concentration of the original solute. This behaviour is due to formation of mixed dimers consisting of molecules of two different compounds, as well as dimers consisting of two identical molecules. A similar interaction between molecules of different substances and between molecules of the same substance is observed in the fluorescence spectrum. In concentrated solutions of mixtures of anthracene derivatives a new fluorescence band (shown in a figure on p 233) appears, similar to a band which appears in single-component concentrated solutions. There are 1 table, 1 figure and 4 references, 3 of which are Soviet and 1 German.

SUBMITTED: May 12, 1958

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24(7), 5(3)

SOV/51-6-4-14/29

AUTHOR: Cherkasov, A.S.

TITLE: On the Effect of Substituent Groups on the Positions of the Absorption and Fluorescence Spectra of Anthracene Derivatives (O vliyani zameshchayushchikh grupp na polozheniye spektrov pogloshcheniya i fluorestsentsii proizvodnykh antratsena)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 4, pp 496-502 (USSR)

ABSTRACT: Introduction of various substituents into the meso-position of anthracene displaces absorption and fluorescence spectra towards lower frequencies. The magnitude of the displacement in the case of disubstituted anthracene was found to be equal to the sum of the displacements due to each substituent separately (Refs 1-5). The present work was undertaken in order to find the effect of more than two substituents on displacement of absorption and fluorescence spectra and the effect of the substituents attached to the rings of anthracene. For this purpose absorption and fluorescence spectra of a number of  $\alpha$ - and  $\beta$ -methyl-derivatives and  $\alpha$ - and  $\beta$ -methylnesoaryl-derivatives of anthracene were obtained. The substances used were purified by multiple re-crystallization and chromatography. Absorption spectra were recorded by means of a spectrometer SF-4 and fluorescence spectra by

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means of a monochromator UM-2 and a photomultiplier FFU-17. The spectra were obtained at room temperature. Ethyl alcohol was used as the solvent. The absorption spectra of 1-, 2- and 9-methylantracene (fig on p 497) show that the position of a substituent influences strongly the displacement of the spectra with respect to the anthracene spectrum. The displacement is different in the short-wavelength and long-wavelength bands. For example, a methyl group in the meso-position produces a considerable displacement of both bands, but the long-wavelength band is displaced somewhat further (by  $150\text{ cm}^{-1}$ ). In the case of 1-methylantracene the displacement of the long-wavelength and short-wavelength bands is the same ( $250\text{ cm}^{-1}$ ), while introduction of a methyl group into the  $\beta$ -position displaces mainly the short-wavelength band (by  $325\text{ cm}^{-1}$ ) and leaves the long-wavelength band practically unaffected (Table 1). Displacements in the absorption and fluorescence spectra of 42 meso-derivatives of anthracene and derivatives with methyl substituents in the side ring of anthracene are given in Table 1. This table includes also the values of departures of the experimentally determined values of displacements from those which were calculated assuming that the displacements of the spectra of

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poly-substituted anthracene are sums of the displacements due to individual substituents. This assumption is called the additivity rule. Frequencies of the absorption and fluorescence maxima are given in Table 2. Table 1 shows that departures from additivity in displacement of the absorption and fluorescence spectra are, in general, very small and do not exceed the experimental error. The departures from additivity occur only when the substituents interact with one another, e.g. in mesodiaryl derivatives with methyl substituents in two  $\alpha$ -positions (absorption and fluorescence spectra), in derivatives with one of the methyl groups at the  $\alpha$ -position (absorption spectra) or at the positions 2 and 3 (fluorescence spectra). There are 1 figure, 2 tables and 8 references, 3 of which are Soviet, 3 German and 2 English.

SUBMITTED: April 26, 1958

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24(7), 5(4)

SOV/51-6-4-15/29

AUTHORS: Cherkasov, A.S. and Vember, T.M.

TITLE: On the Effect of Oxygen on Photochemical Transformations and on Concentration Quenching of Fluorescence in Certain Derivatives of Anthracene (O vliyaniy kisloroda na fotokhimicheskiye prevrashcheniya i kontsentratsionnoye tusheniye fluorestsentsii nekotorykh proizvodnykh antratsena)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 4, pp 503-511 (USSR)

ABSTRACT: The authors showed earlier (Ref 1) that concentration quenching of fluorescence of mesomonoalkyl derivatives of anthracene is due to interaction of excited molecules with non-excited ones, as a result of which stable photo-dimers may be formed. In order to study further the processes of absorption of light energy by such substances, the authors investigated the effect of oxygen on the quantum yields of fluorescence and the quantum yields of photo-dimerization and photo-oxidation to 9-methylantracene, 9-ethylantracene, 9-n-propylantracene and 9-methyl-10-methoxymethylantracene. The experiments were carried out at 20°C. Ethyl alcohol was used as the solvent. The solutions were illuminated with light from a mercury lamp SVD-120 of wavelength ~365 mμ.

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Various amounts of oxygen were introduced into the solutions by saturating them with oxygen, air or a mixture of oxygen and nitrogen at atmospheric pressure. Oxygen was removed from the solutions by blowing of pure nitrogen through them, boiling and eventual cooling or by pumping air out of them (after freezing the solutions with liquid air). The monoalkyl derivatives of anthracene in alcohol solutions form simultaneously photo-oxides and photo-dimers in the presence of oxygen and under the action of light. In contrast to these compounds, 9-methyl-10-methoxymethylanthracene forms only a photo-oxide. On increase of concentration of the studied substances the quantum yield of fluorescence decreases and the quantum yields of photo-dimerization and photo-oxidation increase. The values of the experimentally determined quantum yields of fluorescence ( $\Phi$ ) and of photo-oxidation ( $\Phi_2$ ) and photo-dimerization ( $\Phi_A$ ), on various concentrations of the studied substances ( $[A]$ ) and oxygen ( $[O_2]$ ) are given in Table 1. This table shows that oxygen quenches fluorescence whose yield falls with increase of the amount of oxygen in solutions. The oxygen quenching effect decreases on increase of concentration of the studied substance and the concentration quenching decreases on increase of the amount of dissolved

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oxygen. This suggests that the two processes compete with one another. Dependence of the reciprocals of the quantum yields of fluorescence on the concentration of oxygen (Fig 1a) and on the concentration of the substance (Fig 1 ) are very nearly straight lines, which suggests a diffusion nature of these two quenching processes. The authors explain the results as follows. The solute molecules excited by photons interact with the solvent and become singlet-excited or triplet-excited molecules. The singlet-excited molecules are de-excited by photon emission (i.e. fluorescence) or by interaction with non-excited solute molecules (concentration quenching of fluorescence) to form photo-dimers. Alternately, the singlet-excited molecules may interact with O<sub>2</sub> (oxygen quenching of fluorescence) or with non-excited solute molecules (concentration quenching of fluorescence) to form triplet-excited molecules. The triplet-excited molecules interact with O<sub>2</sub> to produce photo-oxides. The above scheme is confirmed by the agreement between the theoretical (continuous) curves deduced from this scheme and the experimental points (dots, crosses, circles and triangles) shown in Figs 2 and 3.

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Fig 2 gives the dependence of the quantum yield of fluorescence on the concentration of the substance. Fig 3a gives the quantum yield of photo-oxidation of 9-methyl-10-methoxymethylanthracene on the amount of oxygen. Fig 3b gives the dependence of the quantum yields of photo-oxidation and photo-dimerization on the concentration of the substance. There are 3 figures, 2 tables and 15 references, 6 of which are Soviet, 3 German and 6 English.

SUBMITTED: April 2, 1958

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SOV/51-7-3-6/21

AUTHORS: Gherkasov, A.S. and Vember, T.M.

TITLE: On the Effect of n-Toluidine on the Quantum Yields of Photo-Oxidation and Photo-Dimerization of Certain Anthracene Derivatives.

PERIODICAL: Optika i spektroskopiya, 1958, Vol 7, Nr 3, pp 321-325 (USSR)

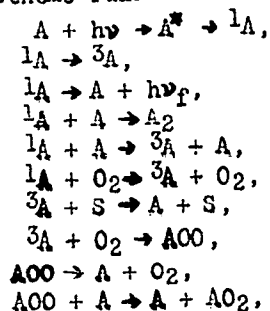
ABSTRACT: The authors studied the effect of n-toluidine (which quenches fluorescence) on the quantum yields of fluorescence, photo-oxidation and photo-dimerization of 9-methyl-10-methoxymethylanthracene (I), which forms only a photo-oxide, and 9-methylanthracene (II), which forms only a photo-dimer in oxygen-free solutions. The experimental technique was the same as used earlier (Ref 3). The values of the quantum yields of fluorescence, photo-oxidation and photo-dimerization of the substances I and II obtained at various concentrations of n-toluidine are shown in Figs 2 and 3. Figs 2a, 2b and 3 show that n-toluidine quenches strongly fluorescence of alcohol solutions of I and II. In the range of concentrations used the reciprocal of the quantum yield of fluorescence is proportional to the concentration of n-toluidine. The quantum yields of the photo-chemical reactions are also reduced in the presence of n-toluidine, photo-oxidation being affected more strongly. For example, the quantum yield of photo-dimerization of the substance II, present in an oxygen-free solution to the extent of  $6 \times 10^{-3}$  mole/litre, was 0.12 in

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the absence of n-toluidine and 0.05 when  $3 \times 10^{-2}$  mole/litre of n-toluidine was added to the solution. The quantum yield of photo-oxidation of the substance I present to the extent of  $6 \times 10^{-3}$  mole/litre in an air-saturated ethanol solution, falls from 0.16 in the absence of n-toluidine to 0.015 when  $3 \times 10^{-2}$  mole/litre of n-toluidine was present. The authors compared the results obtained with a scheme which shows the successive stages of the photo-chemical reactions (Refs 1, 2). This scheme runs as follows:



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where A, A\*, 1A, 3A represent molecules which are non-excited, initially excited and excited into singlet and triplet states, respectively; S represents a molecule of the solvent; O<sub>2</sub> are oxygen molecules; A<sub>2</sub> are photo-dimer molecules; AOO is an intermediate photo-oxide; AO<sub>2</sub> are photo-oxide molecules. From the above scheme it follows that a decrease in the quantum yield of photo-dimerization should be proportional to a decrease in the quantum yield of fluorescence in the case of deactivation of the excited molecules by an external quenching agent. Fig 3 shows that the results obtained for photo-dimerization of II agree well with this prediction. The quantum yields of photo-oxidation of I are, however, smaller (Fig 2a) than those predicted on the basis of the scheme given above. It is shown that to make the theory agree with the experimental data it is necessary to assume that the quenching agent interacts with molecules excited to the singlet state, deactivates them completely and it also decomposes the intermediate photo-oxide producing

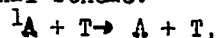
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of Certain Anthracene Derivatives

the original substance A. This can be represented by the following  
additional scheme:



$AOO + T \rightarrow A + TOO$ , where T is the quenching agent.

There are 4 figures, 1 table and 5 references, 3 of which are Soviet,  
1 English and 1 French.

SUBMITTED: December 4, 1958

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SOV/51-7-3-7/21

AUTHOR: Cherkasov, A.S.

TITLE: The Absorption and Fluorescence Spectra and the Fluorescence Quantum Yields of Certain Methyl- and Methylmesoarylanthracenes.

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 3, pp 326-331 (USSR)

ABSTRACT: The absorption and fluorescence spectra and the fluorescence quantum yields were obtained for certain  $\alpha$ - and  $\beta$ -methyl derivatives of anthracene, for mesodiphenylanthracene and mesodiorthotolylanthracene (a total of 17 compounds). The fluorescence (on the left) and absorption (on the right) spectra of the 17 anthracene derivatives are shown in Figs 1-4. The fluorescence quantum yields of ethanol solutions of anthracene and its 17 derivatives are given in a table on p 331. The results obtained show that the proximity of the spatial distribution of the methyl and aryl groups in  $\alpha$ -methylmesoarylanthracenes leads to an interaction between them, which is stronger in the excited state. This interaction is shown in broadening of the vibrational structure of the

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The Absorption and Fluorescence Spectra and the Fluorescence Quantum Yields of  
Certain Methyl- and Methylmesoarylanthracenes

fluorescence spectra, their large displacements towards lower frequencies and, in some cases, it leads to a decrease of the fluorescence quantum yields. There are 4 figures, 1 table and 15 references, 8 of which are Soviet, 4 English, 1 German, 1 French and 1 mixed (French and English).

SUBMITTED: December 4, 1958

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5(4)

AUTHOR:

Cherkasov, A. S.

SOV/20-125-4-45/74

TITLE:

On the Influence Exercised by the Conjugation of an Anthracene Nucleus With the Double Bond of an Alkenyl Substituent Upon the Spectra of Fluorescence and Absorption (O vliyanií sopryazheniya antratsenovogo yadra s dvoynoy svyaz'yu alkenil'nogo zamestitelya na spektry fluorestsentsii i pogloshcheniya)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 4, pp 848-851 (USSR)

ABSTRACT:

The authors investigated the absorption- and fluorescence spectra of some mesoalkenyl derivatives of anthracene: 9,10-diallyl anthracene, 9-n-prop-1'-enyl-10-n-propyl-anthracene, 9,10-di-n-prop-1'-enyl anthracene and 9-vinyl anthracene. The structure formulas of these compounds are given. The absorption spectra were recorded by means of the spectrophotometer SF-4 and the fluorescence spectra by means of the monochromator UM-2 with a photomultiplier as energy receiver. During the investigation of these spectra ethyl alcohol was used as solvent. The fluorescence spectra and the long-wave absorption spectra of the investigated dialenyl

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an Anthracene Nucleus With the Double Bond of an  
Alkenyl Substituent Upon the Spectra of Fluorescence  
and Absorption

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anthracene and of the corresponding dialkyl anthracene (9,10-di-n-propyl anthracene) are shown by a diagram. The second diagram shows the spectra of the 9-vinyl anthracene and the corresponding alkyl derivatives of the 9-ethyl anthracene. According to these diagrams the influence exercised by the alkenyl substituents (which have double bonds in the isolated position in relation to the anthracene nucleus) is similar to the influence exercised by the alkyl substituents. The absorption- and fluorescence spectra of the diallyl anthracene practically agree with respect to shape and position with the spectra of the 9,10-di-n-propyl anthracene. The oscillation structure of these spectra is well resolved. Next, various details of these spectra are discussed. From the results obtained by the present investigations the following conclusions may be drawn: If double bonds with conjugate position exist in the substituent with respect to the anthracene nucleus, there exists an interaction between the  $\pi$ -electrons of the substituent and the  $\pi$ -electrons of the nucleus even if the

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conjugate system is not coplanar. This interaction is considerably more intense in the excited than in the non-excited state. Owing to their high degree of sensitivity with respect to the presence of a conjugation in the molecule, the fluorescence spectra may be used for the purpose of determining the structure of unknown compounds with greater success than if absorption spectra are used. There are 2 figures and 10 references, 6 of which are Soviet.

PRESENTED: December 19, 1958, by A. N. Terenin, Academician

SUBMITTED: December 10, 1958

Card 3/3

S/051/60/009/004/029/034  
E201/E191

AUTHOR: Cherkasov, A.S.

TITLE: Fluorescence Yields of Acetylanthracenes<sup>1</sup> in some Solvent Mixtures

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, No 4, pp 540-542

TEXT: The relative quantum yields of fluorescence of 2-acetylanthracene were found by measuring the areas under fluorescence spectra. The author studied solutions of the same concentrations ( $2 \times 10^{-5}$  mole/litre) and assumed that they all absorbed the same amount of 366 mμ light. One solvent was n-hexane. Various amounts of dioxane, acetone, pyridine, methanol, n-octanol, benzyl alcohol, and ethanol were added to n-hexane and the effects on the fluorescence yield are plotted in Fig 1. Addition of any of the solvents listed above to n-hexane raised the fluorescence yield. In some cases (dioxane, pyridine and acetone) the yield rose almost linearly with the amount of the second solvent. Addition of the alcohols (or acetic acid) raised the yields very rapidly at low concentrations, with subsequent levelling off or even fall of the yield at higher concentrations of the second solvent. The effect of the alcohols was due to

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formation of hydrogen bonds. Addition of a third solvent (which could form hydrogen bonds with methanol) to a solution of 2-acetylanthracene in a mixture of n-hexane and 0.2-0.5 mol.% methanol, was found to neutralize the effect of the alcohol. The general features of behaviour of 2-acetylanthracene were repeated in the case of 1-acetylanthracene. The author found also that his results (Fig 2) contradicted the hypothesis of Zelinskiy et al. (Ref 5) that the fluorescence yield of any one substance is governed by the position of the fluorescence maximum, rather than by the nature of a solvent. There are 2 figures and 5 references: 3 Soviet, 1 English and 1 German.

SUBMITTED: April 27, 1960

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VENBER, T.M.; CHERKASOV, A.S..

Effect of certain fluorescence quenchers on quantum yields  
of photochemical transformations of 9-methylanthracene and  
9-methyl-10-methoxymethylanthracene. Izv.AN SSSR.Ser.fiz.  
24 no.5:577-581 My '60. (MIRA 13:5)  
(Anthracene) (Fluorescence)

CHERKASOV, A.S.

Effect of solvents on the fluorescence spectra of acetylanthracenes. Izv.AN SSSR.Ser.fiz. 24 no.5:591-595 My '60.  
(MIRA 13:5)

(Fluorescence) (Anthracene)

CHERKASOV, A.S.; VOLDAYKINA, K.G.

Spectral study of the products obtained from the polymerization of  
styrene with 9-vinylnanthracene additions. Vysokom.soed. 3 no.4:570-  
576 Ap '61. (MIRA 14:4)  
(Anthracene) (Styrene)

CHERKASOV, A.S.; DRAGNEVA, G.I.

Effect of the solvent density on the fluorescence spectra of certain  
organic compounds. Opt. i spektr. 10 no.4:466-472 Ap '61.  
(MIRA 14:3)

(Flourescence)(Spectrum analysis) (Solvents)

VEMBER, T.M.; CHERKASOV, A.S.

Effect of *p*-toluidine and potassium iodide on the fluorescence  
and photooxidation of 9,10-di-n-propylanthracene. Opt. i spektr. 10  
no.4:544-546 Ap '61. (MIRA 14:3)

(Anthracene) (Toluidine)  
(Potassium iodine)

CHERKASOV, A.S.; Prinimal uchastiye SHIROKOV, V.I.

Effect of fluorescence quenchers on fluorescence spectra of solutions containing certain derivatives of anthracene and phthalimide in mixed solvents. Dokl. AN SSSR 139 no.3:658-661 J1 '61. (MIRA 14:7)

1. Predstavleno akademikom A.N. Tereninym.  
(Anthracene--Spectra) (Phthalimide--Spectra)

CHERKASOV, A.S.

Role of donor-acceptor interaction in the effect exerted by  
a solvent on the fluorescence spectra of certain anthracene  
and phthalimide derivatives. Opt. i spektr. 12 no.1:73-80  
Ja '62. (MIRA 15:2)

(Quantum theory)  
(Anthracene--Spectra)  
(Phthalimide--Spectra)

BAKHSHIYEV, N.G.; KLOCHKOV, V.P.; NEPORENT, B.S.; CHERKASOV, A.S.

Absorption and fluorescence of vapors of anthracene and its  
derivatives. Opt. i spektr. 12 no.5:582-585 My '62. (MIRA 15:5)  
(Fluorescence) (Anthracene--Spectra)



24.3500 (1137, 1138, 1144)

33132  
S/048/62/026/001/008/018  
B117/3102

AUTHOR: Cherkasov, A. S.

TITLE: Relaxation of a solvent during the period in which dissolved molecules are in the excited state, and the fluorescence spectra

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 1, 1962, 81 - 83

TEXT: The effect of the medium in which molecules of a dissolved substance are excited upon their fluorescence spectra has been studied. The molecules of the solvent were assumed to be always oriented to a greater or lesser extent with respect to the molecules of the dissolved substance. Hence, if the latter change their state due to excitation, the molecules of the solvent should re-orient accordingly. This re-orientation is easiest to be detected in those systems in which the interaction of the solvent with excited molecules differs from that with nonexcited molecules. The following course has been found for the temperature dependence of the position of fluorescence spectra of some phthalimides, stilbene derivatives,

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Relaxation of a solvent during the...

33432  
S/048/62/026/001/008/018  
B117/B102

and acetyl anthracenes in hydroxyl-containing solvents: on a drop of temperature, the spectral peaks first shift toward the longwave, and then toward the shortwave region. Once they have reached a determined position, they are hardly affected by further temperature drop. This course is explained by the vitrifying power that is characteristic of the solvents used, and also by the relaxation time differing with different temperatures. Since the longwave radiation is emitted by the molecules excited longest, it must be possible to establish a relationship between duration and wavelength of fluorescence. This conclusion is backed by direct phase-fluorometric measurements. The largely temperature-dependent phase shift attains its peak value at a temperature somewhat below the one corresponding to the maximum shift in the fluorescence spectrum to longer waves. The change of the latter by the introduction of extinguishing substances also points to the existence of different radiation centers. The experiments have shown, as expected, that excited molecules with the longest lifetime are extinguished strongest. As results have shown, the interaction of the solvent with excited molecules is a process competing with extinction, i. e., it takes place in a period which is comparable with the lifetime of the excited state. To conclude, luminescence

Card 2/3

Relaxation of a solvent during the...

33432  
S/048/62/026/001/008/018  
B117/B102

provides an extremely fine method for studying intermolecular interactions in solutions. S. I. Vavilov is mentioned. There are 9 references: 8 Soviet and 1 non-Soviet.

X

Card 3/3

CHERKASOV, A.S.

Spectral detection of S-cis- and S-trans-isomers of  
2-vinyanthracene. Dokl. AN SSSR 146 no.4:852-855  
0 '62. (MIRA 15:11)

1. Predstavleno akademikom A.N. Tereninym.  
(Anthracene—Spectra)

S/190/63/005/001/011/020  
B101/B186

AUTHORS: Cherkasov, A. S., Voldaykina, K. G.

TITLE: Spectroscopic study of the interaction between anthracene derivatives and monomers during polymerization. II. Interaction of anthracene with styrene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 1, 1963, 79-86

TEXT: Anthracene was dissolved in styrene and was polymerized, both with and without benzoyl peroxide, in order to explain the behavior of luminescing plastics. The time of heating was varied between 1 and 150 hrs, the temperature was kept between 80 and 154°C, and the concentration of anthracene was changed between 0.5 and 15.2%. Low-molecular products were removed from the polymer by reprecipitation, and its absorption and fluorescence spectra were recorded. The existence of a weak absorption band in the region of long waves ( $26900\text{ cm}^{-1}$ ) indicated hydrogen substitution in the meso-position of anthracene by styrene or polystyrene. Its fluorescence spectrum also corresponded to that of Card 1/3 ✓

Spectroscopic study of the ...

S/190/63/005/001/011/020  
B101/B186

monosubstituted anthracene. The conversion of 5% anthracene into styrene anthracene or polystyrene anthracene was estimated from the intensity of absorption band. The polymer contained 20 - 28% of the anthracene addition, whatever the polymerization conditions. Polymerization of anthracene dissolved in styrene at 144°C showed that during the first 4 hrs the ratio polymerization degree : degree of anthracene conversion remained constant at 0.5 independently of the initial anthracene concentration (0.5 - 2.4%). The synthesis of the anthracene-styrene adduct was reached after 150 hrs at 120°C, and after 4 hrs at 200 - 210°C. A crystalline substance, m. p. 95 - 96.5°C, was obtained, whose molecular weight corresponded to an adduct consisting of 1 molecule anthracene and 1 molecule styrene. Its absorption spectrum confirmed the addition of styrene in the 9, 10 positions of anthracene, which again proves a diene synthesis. Heating to 260°C caused decomposition. The absorption and fluorescence spectra of the substance crystallized by cooling (m. p. 193 - 200°C) corresponded to those of anthracene. There are 4 figures and 1 table.

Card 2/3

Spectroscopic study of the ...

S/190/63/005/001/011/020  
B101/B186

SUBMITTED: July 18, 1961

Card 3/3

✓

L 10160-63

EPF(c)/EWT(m)/BDS--ASD--Pr-4--

RM/MAY

ACCESSION NR: AP3000314

S/0048/63/027/005/0628/0533

AUTHOR: Cherkasov, A. S.; Voldaykina, K. G.

59

TITLE: Absorption and fluorescence of vinyl anthracenes and change of the molecular configuration due to excitation [Report: Eleventh Conference on Luminescence held at Minsk 10-15 Sept. 1962]

SOURCE: Izvestiya AN SSSR. Seriya fizicheskaya, v. 27, no. 5, 1963, 628-633

TOPIC TAGS: methyl anthracenes, vinyl anthracenes, anthracene, fluorescence, molecular absorption

ABSTRACT: As a result of investigation (Cherkasov, A. S., Doklady AN SSSR, 125, 848, 1951) of anthracene derivatives with an alkyl group in the meso position in the anthracene nucleus it was found that such substituents have a minor effect on the absorption and fluorescence spectra of anthracene, namely, produce a shift of both spectra to the side of lower frequencies. It was deemed of interest to see how the spectra would be affected by changes in the position of the substitute; accordingly, there were synthesized and investigated 9-vinyl, 1-vinyl and 2-vinyl

Card 1/2



L 10160-63

ACCESSION NR: AP3000314

anthracenes, steric hinderance in which differs. The spectra of the vinyl derivatives are compared with the spectra of the corresponding methyl derivatives. The effect of the substituennts is attributed to enhanced interaction of the pi electrons of the substituent group with the pi electrons of the anthracene nucleus. It is shown that in the case of 2-vinyl anthracene in alcohol solutions there occurs cis-trans isomer conversion under the influence not only of temperature but also excitation. This is substantiated by the shift of the fluorescence spectrum as a result of addition of a quenching agent to the alcohol solution. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: PH

NR REF SOV: 002

OTHER: 004

Card 2/2

VEMBER, T.M.; KIYANSKAYA, L.A.; CHERKASOV, A.S.

Relative rates of the photochemical transformations of anthracene  
derivatives. Zhur.ob.khim. 33 no.7:2342-2347 J1 '63.  
(MIRA 16:8)

(Anthracene) (Photochemistry)

S/C20/63/149/001/016/023  
B1C1/B144

AUTHORS: Vasil'yev, R. F., Vichutinskiy, A. A., Cherkasov, A. S.

TITLE: Chemiluminescence activated by anthracene derivatives

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 149, no. 1, 1963, 124-127

TEXT: Luminescence spectra were used for studying how the oxidation of cyclohexane dissolved in benzene, or that of ethyl benzene by anthracene or its derivatives, is activated after having been initiated with  $\alpha, \alpha'$ -bis-isobutyric nitrile. The chemiluminescence spectrum of the oxidizing cyclohexane shows a slightly marked 430 - 450 m $\mu$  band. Addition of the activator changes the spectrum so as to make it identical with the fluorescence spectrum. Thus the reaction energy is transferred to the activator which is put into the excited singlet state. The effect of the anthracene derivatives is identical in the oxidation of cyclohexane and ethyl benzene. Bromo anthracene, dibromo anthracene, bromo-phenyl anthracene, dichloro anthracene and diphenyl anthracene are good activators. Anthracene, di-n-propyl anthracene and dimethyl anthracene are bad activators. The following ratios  $k_{PA}/f_P$  (1/mole) are given, where  $k_{PA}$  is

Card 1/2

Chemiluminescence activated by ...

S/020/63/149/001/016/023  
B101/B144

the probability of energy transfer and  $f_p$  is the probability of emission: dibromo anthracene  $6 \cdot 10^6$ , bromo-phenyl anthracene  $2 \cdot 10^6$ , dichloro anthracene  $2 \cdot 10^5$ , bromo anthracene  $2 \cdot 10^6$ , and diphenyl anthracene  $1 \cdot 10^4$ . The intensification factor,  $\kappa$ , is described by:  $(\kappa - 1)^{-1} = b + c[A]^{-1}$ , where  $[A]$  is the concentration of the activator. The low yield of chemiluminescence is connected with the low yield of excited product, but it is mainly due to the low effectiveness of excitation. From the fact that the activity of the anthracene derivatives increases with increasing content of halogen atoms and with the atomic number of the halogen, a triplet-singlet transfer is assumed. There are 4 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: October 1, 1962, by V. N. Kondrat'yev, Academician

SUBMITTED: September 24, 1962

Card 2/2

CHERKASOV, A.S.; VOLDAYKINA, K.G.

Copolymerization of 2-vinyl-9,10-diphenylanthracene with styrene.  
Vysokom.soed. 7 no.1:175-179 Ja '65.

(MIRA 18:5)

BAZILEVSKAYA, N.S.; CHERKASOV, A.S.

Excited dimers of anthracene derivatives. Opt. 1 spektr. 18  
no.1:58-62 Ja '65. (MIRA 18:4)

L 22892-65 EWT(m)/EPF(c)/EWP(j)/T/ Pc-4/Pr-4/P.-4 RM/RWH

ACCESSION NR: AP5003038

S/0051/65/018/001/0145/0147

AUTHOR: Bazilevskaya, N. S.; Cherkasov, A. S.

TITLE: Excited dimers of anthracene derivatives

B

SOURCE: Optika i spektroskopiya, v. 18, no. 1, 1965, 145-147

TOPIC TAGS: anthracene, excited dimer, luminescence quenching, photochemical oxidation, anthracene derivative

ABSTRACT: The first part of the article was published in Opt. i spektr. v. 18, 58, 1965. The authors have established, by investigating the fluorescence spectra of several dimesoalkyl derivatives of anthracene (9,10-dimethyl, 9,10-diethyl, 9,10-di-n-propyl-, and 9,10-di-n-butyl anthracenes) under different concentrations in solution, that all these compounds are also capable of producing excimers (excited dimers), in contrast to an opinion advanced by J. B. Birks and L. G. Christophorou (Nature, v. 197, 1064, 1963). The observation of excimer luminescence in such compounds is hindered only by the presence of oxygen, owing to its quenching and the intense reaction of photochemical oxidation of the dimesoalkyl anthracenes at high concentrations. This is corroborated by test results obtained

Card 1/2

L 22892-65

ACCESSION NR: AP5003038

with dipropyl anthracene, which are discussed in some detail. Orig. art. has:  
1 figure and 1 table.

ASSOCIATION: None

SUBMITTED: 08Feb64

ENCL: 00

SUB CODE: OC, OP

NR REF SCV: 004

OTHER: 003

Card 2/2



L 25278-65 EWT(1)/EWT(m)/EWP(j) IJP(c) RM

ACCESSION NR: AP5003040

S/0051/65/018/001/0150/0151

AUTHOR: Kudryashov, P. I.; Kolobkov, V. P.; Cherkasov, A. S.

TITLE: Luminescence<sup>1</sup> of Eu-dibenzoylmethanate<sup>1</sup> under pulsed excitation

SOURCE: Optika i spektroskopiya, v. 18, no. 1, 1965, 150-151

TOPIC TAGS: luminescence, organic luminor, chelate, rare earth compound, stimulated emission, optical pumping

ABSTRACT: The authors have obtained data which show that the changes produced by high-power pumping in the luminescence of  $\text{EuD}_3$  (Eu-dibenzoylmethanate) are not due to stimulated emission, as assumed by A. Lempicki and H. Samelson (Appl. Phys. Lett. v. 2, 159, 1963). The tests were made on a solution of  $\text{EuD}_3$  in ethyl alcohol contained in sectional resonator-cuvettes 6 mm in diameter and 50 mm long, at different  $\text{EuD}_3$  concentrations ( $1.5 \times 10^{-4}$  —  $5 \times 10^{-3}$  mole/liter) and at different temperatures (from -160 to -110°C). The time sweep of the  $\text{EuD}_3$  luminescence pulse was investigated as a function of various factors for the brightest fundamental emission line (613 nm). A hypothesis is advanced that the

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L 25278-65

ACCESSION NR: AP5003040

4

results can be attributed to reabsorption of the emission from the  $\text{Eu}^{3+}$  ion, occurring under sufficiently strong excitation. Additional confirmation of the reabsorption hypothesis was provided by tests made at 597 nm, which showed that the shape of the emission pulse varied with all the investigated factors in similar fashion for both the 597- and 613-nm lines. "We thank I. A. Zhmyrev, S. V. Volkov, and G. A. Mokeyeva for great help during the work, and T. M. Vember for synthesizing the  $\text{Eu}_2\text{O}_3$  used." Orig. art. has: 2 figures. [02]

ASSOCIATION: None

SUBMITTED: 18Feb64

ENCL: 00

SUB CODE: OP, EC

NO REF SOV: 000

OTHER: 002

ATD PRESS: 3181

Card 2/2

BAZILEVSKAYA, N.S.; LIMAREVA, L.A.; CHERKASOV, A.S.; SHIROKOV, V.I.

Fluorometric determination of the lifetime of the excited state  
of excited dimers (excimers) in anthracene derivatives. Opt. i  
spektr. 18 no.2:354-356 F '65. (MIRA 18 4)

L 65231-65 EPP(c)/EWT(1)/EWT(m)/EWP(j)/EWA(c) IJP(c)/EPL JW/RM

ACCESSION NR: AP5020796

UR/0048/65/029/008/1340/1348 41

AUTHOR: Veselova, T. V.; Limareva, L. A.; Cherkasov, A. S.; Shirokov, V. I.

TITLE: Fluorometric detection and investigation of processes accompanying change of the spectral composition of luminescence during its decay /Report, 13th Conference on Luminescence held in Khar'kov 25 June to 1 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 8, 1965, 1340-1348

TOPIC TAGS: phosphorescence, solution property, luminescence spectrum, time constant

ABSTRACT: The fluorometric phase spectra of a number of fluorescent systems were measured with an apparatus and technique that have been described elsewhere (A.M. Bonch-Bruyevich, I.V. Karazin, V.A. Molchanov, and V.I. Shirokov, Priroda i tekhnika eksperimenta, 4, 631, 1958) and that allow measurements to be made in a narrow spectral range isolated with a monochromator. The results are presented graphically and are discussed in considerable detail. Measurements were made at three temperatures between 24 and -183°C of the fluorescence of 1,3- and 1,4-dimethyl-9,10-di-o-tolylanthracene in alcohol solutions. The results are interpreted in

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L 65231-65

ACCESSION NR: AP5020796

2  
7

terms of a four-level excitation scheme. The fluorescence of 2-vinyanthracene in alcohol solution was investigated. The wavelength variation of the fluorometric phase was considerable at 20°C and barely perceptible at -183°. The results are consistent with A.S.Cherkasov's interpretation (Dokl. AN SSSR, 146, 852, 1962) in terms of *sic* - *trans* transformations. In order to investigate the effect of solvent molecules, measurements were made of the fluorescence of 3-amino-N-methylphthalimide in mixtures of n-heptane and pyridine. The results obtained at low pyridine concentrations are consistent with the presence in the solution of only two kinds of luminescence centers. The effect of the pyridine appears to be to facilitate the formation of intermolecular bonds. At high pyridine concentrations the effect of the pyridine appears to be merely to alter the dielectric constant and refractive index. When the pyridine was replaced by n-butanol, it was no longer possible to interpret the results in terms of a two-component fluorescence spectrum. This is ascribed to the possibility of formation of hydrogen bonds between the hydrogen of the amino groups of the 3-amino-N-methylphthalimide and the oxygen of the n-butanol, and between the oxygen of each of the carbonyl groups of the 3-amino-N-methylphthalimide and the hydrogen of the hydroxyl group of the n-butanol. Orig. art. has: 3 formulas and 7 figures.

Card 2/3

L 65231-65

ACCESSION NR: AP5020796

ASSOCIATION: none

ENCL: 00

SUB CODE: GC, OP

NO REF SOV: 013

OTHER: 001

Card

7/14  
3/3

L 4425-66 EWT(1)/EWT(m)/EPT(c)/EWP(j)/T/EWA(h)/EWA(c) IJP(c) RM  
 ACCESSION NR: AP5017895 UR/OC51/65/019/001/0078/0085  
 535.372:535.373.3:541.65  
 44.85  
 AUTHORS: Veselova, T. V.; Limareva, L. A.; Cherkasov, A. S.;  
 Shirokov, V. I. 44.85  
 TITLE: Fluorometric study of the influence of the solvent on the  
 fluorescence spectrum of 3-amine-N-methylphthalimide 52  
 49  
 SOURCE: Optika i spektroskopiya, v. 19, no. 1, 1965, 78-85 13  
 21.44.85  
 TOPIC TAGS: fluorescence spectrum, light excitation, luminescence,  
 luminor, organic solvent  
 ABSTRACT: To obtain additional information on the character of the  
 intermolecular interaction influencing the position of the fluores-  
 cence spectra, the authors carried out fluorometric measurements of  
 the phase delay of the luminescence light, relative to the exciting  
 light, in narrow spectral sections, covering the entire fluorescent  
 spectrum of solutions of 3-amine-N-methylphthalimide in mixtures of  
 n-heptane + pyridine and n-heptane + n-butanol at 20C, and in pure.  
 Card 1/3

L 4425-66

ACCESSION NR: AP5017895

n-butanol at 20 -- -183C. The fluorometric measurements were carried out with the GOI fluorometer of 1958 (A. M. Bonch-Bruyevich et al., PTE no. 2, 53, 1958) at an exciting-light modulation frequency of 11.2 Mc. The narrow sections of the fluorescent spectra were separated with a UM-2 monochromator. The fluorometric phase in heptane solutions with small addition of pyridine and n-butanol was found to vary over the spectrum. This is attributed to the formation of hydrogen bonds between the molecules of the luminor and the active solvent. A similar phenomenon observed in a butanol solutions is examined over a certain temperature range from the viewpoint of re-orientation of the solvent molecules to an equilibrium configuration corresponding to the excited luminor molecule. In the butanol, as the temperature increased from -183 to 20C, the fluorescence spectrum shifted to the red, and a change in the  $\phi$  phase developed, becoming particularly strong at -70 -- -90C, decreasing with further increasing temperature, and practically disappearing at 20C. In the case of the heptane solution, addition of pyridine shifted the fluorescence spectra to the red and strengthened the dependence of the phase on the frequency. This dependence weakened with increasing pyridine concen-

Card 2/3



L 4425-66

ACCESSION NR: AP5017895

44,55 3  
tration. 'We thank V. V. Zelinskiy for supplying the 3-amine-N-methylphthalimide.' Orig. art. has: 5 figures and 8 formulas.

ASSOCIATION: None

SUBMITTED: 13Apr64

ENCL: 00

SUB CODE: OP, GC

NR REF SOV: 011

OTHER: 001

Card 3/3

BAZILEVSKAYA, N.S.; CHENKASOV, A.S.

Two fluorescence bands in spectra of mesanthraconcarboxylic  
acids, and esters. Zhur. prikl. spekt. 3 no. 6:548-554  
D '65 (MIRA 19:1)

1. Submitted July 27, 1964.

L 01279-66 ENT(1)/ENT(m)/EPF(c)/EWP(j) IJP(c) RM

ACCESSION NR: AP5020784

UR/0048/65/029/008/1284/1294

AUTHOR: Cherkasov, A. S.; Bazilevskaya, N. S.

TITLE: Excited dimers (excimers) of anthracene derivatives and concentration quenching of fluorescence /Report, 13th Conference on Luminescence held in Khar'kov 25 June to 1 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 8, 1965, 1284-1294

TOPIC TAGS: luminescence quenching, solution property, anthracene, nonmetallic organic derivative, intermolecular complex, excited state

ABSTRACT: The literature relating to the fluorescence of solutions of anthracene derivatives is reviewed in some detail (there are 50 references) with particular regard to excimer formation. Aromatic compounds are of particular interest in regard to excimer formation because their plane structure favors the "sandwich" excimer structure and a variety of molecular shapes are available among their derivatives. The conclusion of J.B.Birks and L.G.Christophorou (Nature, 197, 1064, 1963; Proc. Roy. Soc., A274, 552, 1963) that dimeso-substituted anthracenes cannot form excimers for steric reasons has been proved incorrect; on the other hand,

Card 1/3

L 01279-66

ACCESSION NR: AP5020784

9,10-diphenylanthracene does not exhibit concentration quenching and does not form excimers. The thermal dissociation of excimers can lead to a decrease of concentration quenching with increasing temperature at high temperatures. The temperature dependence of concentration quenching in dipropylanthracene shows that in this compound the quenching is entirely due to excimers, and it is suggested that this may also be the case in other compounds. In some cases, however, the presence of other quenching mechanisms together with the excimer mechanism can be demonstrated. Anthracene itself does not form excimers, but it forms mixed excimers with 9-acetoxyanthracene and presumably also with other derivatives. It is concluded that the principal (if not the only) mechanisms of concentration quenching of fluorescence in anthracene derivatives are the formation of excimers and stable photodimers. It is also suggested that the long wavelength diffuse luminescence band observed in anthracenecarboxylic acids in nonpolar solvents is due to excimers which, however, also exist in the unexcited state. Orig. art. has: 4 formulas, 5 figures, and 1 table.

Card 2/3

L 0127-66

ACCESSION NR: AP5020784

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: GC, OP

NO REF SOV: 013

OTHER: 037

Card 3/3

04755-67 EWP(j)/EWT(m) RM

ACC NR: AP6025953

SOURCE CODE: UR/0051/66/021/001/0045/0050

AUTHOR: Neznayko, N. F.; Obyknovennaya, I. Ye.; Cherkasov, A. S.

ORG: none

TITLE: Formation of mixed excimers during quenching of monomer and excimer fluorescence of dimesoalkylanthracenes with 9-acetylanthracene

SOURCE: Optika i spektroskopiya, v. 21, no. 1, 1966, 45-50

TOPIC TAGS: anthracene, fluorescence quenching

ABSTRACT: When different derivatives of anthracene<sup>1</sup> are present simultaneously in solution, the formation of molecular association due to the interaction of excited molecules of one compound with unexcited molecules of another compound occurs. These molecular associations are called mixed excimers. The formation of mixed excimers is accompanied by the emission of a long wavelength fluorescence band and decrease of the quantum yield of the fluorescence of monomers. This investigation was conducted in order to determine whether or not excimer luminescence will be produced if the excimer contains a nonfluorescent molecule in its composition or if such a molecule will cause rapid radiationless deactivation. For this purpose, the effect of nonfluorescing 9-acetylanthracene on the luminescence of deoxygenated toluene solutions of 9,10-dimethylantracene and 9,10-di-n-propylantracene was investigated. Luminescence was

Card 1/2

UDC: 535.373.4

04755-67

ACC NR: AP6025953

excited by 405 mμ radiation produced by a mercury vapor lamp. Introduction of 9-acetylanthracene into low concentration solutions of 9,10-dimethylantracene and 9,10-di-n-propylantracene leads to a quenching of fluorescence without any changes in the general form of the spectrum. When the concentration of dimethylantracene and di-propylantracene is high, in addition to the fluorescence of monomers, the fluorescence band of excimers is also apparent. Thus, although 9-acetylanthracene does not belong to the class of typical fluorescence quenchers causing a decrease in fluorescence yield of different compounds, it does selectively quench the fluorescence of anthracene derivatives. A mechanism is proposed for the quenching of excimer fluorescence as well as the rate constants for the processes involved. Orig. art. has: 3 figures, 1 table.

SUB CODE: 07/

SUBM DATE: 29Mar65/

ORIG REF: 038/

OTH REF: 003

KN

Card 2/2

CHERKASOV, A. V.

"Method of Directing Activities of Students' Scientific Clubs in Clinical Departments of Pediatric Schools," *Pediatriya* No.3, 1952



LUR'YE, A. Yu., redaktor; CHERKASOV, Aleksandr Vladimirovich, redaktor.

[Aid to the rural midwife] Na dopomogu sil's'kii akushertsii.  
Kyiv, Derzh.med.vits-vo URSR, 1955. (MLRA 9:5)  
(OBSTETRICS)

CHERKASOV, Aleksandr Vladimirovich

[Whooping cough in children and its control] Kokliush u ditei i  
borot'ba s nym. Kyiv, Derzh. med.vyd-vo URSR, 1957. 15 p.  
(WHOOPING COUGH) (MIRA 11:6)

CHERKASOV, A.

DAYKHES, Maksim Timofeyevich, dotsent; CHERKASOV, A.V., red.; LOKHMATYY,  
Ye.G., tekhn.red.

[Prophylaxis and treatment of disturbances of the appetite in  
children] Profilaktika i lechenie rasstroistv appetita u detei.  
Kiev, Gos.med.izd-vo USSR, 1957. 69 p. (MIRA 11:1)  
(APPETITE) (CHILDREN--DISEASES)

Cherkasov A.V.

YAKHIN, Naum Borisovich, kand.med.nauk; CHERKASOV, A.V., red.; GITSETEYE, A.D.,  
tekhn.red.

[Infections mononucleosis; Filatov's disease] Infektsionnyi  
mononukleoz; bolezni' Filatova. Kiev, Gos.med.izd-vo USSR, 1957.  
160 p. (MIRA 11:1)

(MONONUCLEOSIS)

DYACHENKO, Sergey Stepanovich [Diachenko, IE.IE.], prof.; CHERKASOV,  
A.V., prof., glavnyy red.

[Urgent problems in preventive inoculation] Aktual'ni pytannia  
profilaktychnoi immunizatsii. Kyiv, 1959. 43 p. (Tovarystvo  
dlia poshyrennia politychnykh i naukovykh znan' URSS. Ser.5,  
no.5) (MIRA 12:7)

(VACCINATION)

CHERKASOV, Aleksandr Vladimirovich, prof.; BABKO, I.M., red.

[Prevention of tuberculosis in children] Zapobihannia  
tuberkul'ozu u ditei. Kyiv, Zdorov'ia, 1965. 29 p.  
(MIRA 19:1)

14(9)

SOV/112-59-2-2638

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 2, p 52 (USSR)

AUTHOR: Cherkasov, A. Ye.

TITLE: Average Annual Runoff, Its Variation, and Monthly Distribution in the Yenisey-River Basin (Without the Angara River) (Sredniy godovoy stok, yego izmenchivost' i vnutrigodovoye raspredeleniye v basseynе r. Yeniseya /bez Angary/)

PERIODICAL: Tr. Leningr. gidrometeorol. in-ta, 1958, Nr 7, pp 55-73

ABSTRACT: From statistics of hydrometric data, normal runoffs and their variation over yearly and monthly periods are found. The relations between (a) the variation factor of the annual runoff, (b) the average runoff modules over many years, and (c) the catchment areas are determined; general considerations about the runoff distribution within one year and its sources are given. Seven characteristic areas are singled out, and monthly runoff distribution for individual rivers in this area presented. Vernal runoff is 40-75%; winter runoff does not exceed 10% of the annual.

Card 1/1

Ye.A.I.

14(9)

SOV/112-59-2-2642

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 2, p 52 (USSR)

AUTHOR: Cherkasov, A. Ye.

TITLE: Analysis and Methods for Estimating the Maximum Vernal Runoff of the Yenisey Basin Rivers (Without the Angara River) (Analiz i metodika rascheta maksimal'nogo stoka vesennego polovod'ya na rekakh basseyna Yeniseya /bez Angary/)

PERIODICAL: Tr. Leningr. gidrometeorol. in-ta, 1958, Nr 7, pp 74-92

ABSTRACT: It is stated that the genetic methods for determining the maximum discharges for Yenisey-basin rivers are unacceptable; application of the existing formulae is limited because of lack of initial information. D. L. Sokolovskiy's formula of 1937 is recommended. A table is presented of actual maxima and their distribution parameters  $C_s$  and  $C_v$  for a number of rivers.

Ye. A. I.

Card 1/1



CHERKASOV, A. Ye.: Master Geogr Sci (diss) -- "Analysis of the formation and methods of calculating the runoff of the rivers in the Yenisey basin (not including the Angara)". Leningrad, 1958. 11 pp (Min Higher Educ USSR, Leningrad Hydrometeorological Inst), 150 copies (KL, No 1, 1959, 115)

*Cherkasov, Boris, Aleksandrovich*

PHASE I BOOK EXPLOITATION

359

Zalmanzon, Lev Abramovich, and Cherkasov, Boris Aleksandrovich

Regulirovaniye gazoturbinnnykh i pryamotochnnykh vozdushno-reaktivnykh dvigateley (Control of Gas-turbine and Ramjet Engines) Moscow, Oborongiz, 1956. 374 p. 6,500 copies printed.

Reviewers: Petrov, B. N., Corresponding Member, USSR Academy of Sciences, and Bodner, V. A., Dr. of Technical Sciences, Prof.;  
Ed.: Sobolev, O. K.; Ed. of Publishing House: Belitskaya, A. M.;  
Tech. Ed.: Zudakin, I. M.; Managing Ed. (Oborongiz):  
Sokolov, A. I., Eng.

PURPOSE: This is a textbook approved by the Ministry of Higher Education for students of aviation vtuzes. It may also be useful to workers specializing in the field of aircraft engines.

COVERAGE: The book is mainly concerned with describing the physical bases of engine control processes and with setting forth methods for experimental research and design of control devices. The close connection in the operation of the

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Control of Gas-turbine (Cont.)

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elements of the control system and of the fuel supply system of the engine is revealed in a number of examples. Characteristics of the individual elements of the oil system are presented. The author thanks V. A. Bodner, B. N. Petrov, V. S. Zuyev, F. A. Korotkov, Yu. P. Portnov-Sokolov and N. V. Inozemtsev for their help in preparing the book. There are 148 references, of which 136 are Soviet (8 translations), 11 English and 1 French.

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Cherkassov, B.A.

1756. EXAMINATION OF THE WORKING PROCESS IN A STAGE OF A GAS TURBINE.  
(ISSLEDOVANIYA RABOTNITS PROTSNENIYA V OTDELNOI TURBINE).  
Cherkassov, B.A. [Ed]. (Izd. Mosk. Aviat. Inst. (Proc. Moscow Aviat.  
Inst.), 1956, (58), 1-121; title in Collect's Russ. Lang. Nat. Sci. Bk, 1956,  
21).

RDA amf



~~CHERKASOV~~, B.A., kandidat tekhnicheskikh nauk; YEMIN, O.N., kandidat tekhnicheskikh nauk.

Analytical calculation of gas turbine characteristics with account taken of losses derived by plane cascade tests. Trudy MAI no. 68:5-41 (MIRA 10:1)  
'56. (Gas turbines--Aerodynamics)

CHERKASOV, B.A., kandidat tekhnicheskikh nauk.

Secondary losses and their effect of the performance of a turbine  
stage. Study MAI no.68:42-60 '56. (MIRA 10:1)  
(Gas turbines--Aerodynamics)

CHERKASOV, B.A., kandidat tekhnicheskikh nauk, dotsent.

Preface. Trudy MAI no.82:3-4 '57.  
(Gas turbines)

(MIRA 10:10)

CHERKASOV, B.A., kandidat tekhnicheskikh nauk.

Calculating the characteristics of multistage gas turbines.  
Trudy MAI no.82:7-29 '57. (MIRA 10:10)  
(Gas turbines)

CHERKASOV, B.A.

CHERKASOV, B.A., kandidat tekhnicheskikh nauk.

Effect of the rate of reactivity on the load of turbine stages.  
Trudy MAI no.82:49-58 '57. (MIRA 10:10)  
(Gas turbines)

CHERKASOV, B.A.

CHERKASOV, B.A., kandidat tekhnicheskikh nauk.

Characteristics of plane flow through turbine stages. Trudy MAI  
no.82:73-81 '57. (MIRA 10:10)  
(Gas turbines)

STEPANOV, Georgiy Yur'yevich; UVAROV, V.V., prof., doktor tekhn. nauk, retsenzent; INOZEMTSOV, N.V. [deceased], prof. doktor tekhn. nauk, retsenzent; CHERKASOV, B.A., dots., kand. tekhn. nauk, retsenzent; YEVGRAFOV, K.G., inzh., red.; MONASTYRSKAYA, A.M., red. izd-va; EL'KIND, V.D., tekhn. red.

[Principles of the theory of turbomachinery, compound and gas-turbine engines] Osnovy teorii lopatochnykh mashin, kombinirovannykh i gazoturbinnnykh dvigatelei. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1958. 350 p. (MIRA 11:10)  
(Turbomachines)

SOV/112-59-2-2342

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 2, p 8 (USSR)

AUTHOR: Cherkasov, B. A.

TITLE: Adoption of a Permanent-Magnet Alloy Without Subsequent Thermal Treatment (Vnedreniye magnitnogo splava dlya magnetov bez posleduyushchey termoobrabotki)

PERIODICAL: Avtotrakt. elektrooborudovaniye, 1958, Nr 1, pp 67-69

ABSTRACT: Alloys are described that ensure optimum magnetic properties without additional thermal treatment. The alloys consist of: 23-26% Ni; 15-16% Cu; up to 0.2% Ti and 0.1% Si; the balance is Fe. Using these alloys in manufacturing magneto-electric generators considerably raised the number of engineering-and-economic indexes, simplified processing, reduced reject, and resulted in great savings. (KATEK.)

A.O.M.

Card 1/1



CHERKASOV, B.A.

Effect of the law of temperature distribution and the method of  
profiling on the length of turbine blades. Izv. vys. ucheb. zav.;  
av. tekhn. no. 2: 128-132 '58. (MIRA 11:6)

1. Moskovskiy aviatsionnyy institut, Kafedra AD-1.  
(Gas turbines) (Blades)

SOV/137-59-1-1856

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 1, p 246 (USSR)

AUTHOR: Cherkasov, B. A.

TITLE: Sulfiding Process for Treatment of Tools and Parts (Primeneniye protsessa sulfidirovaniya dlya obrabotki instrumenta i detaley)

PERIODICAL: V sb.: Materialy Soveshchaniya glavn. metallurgov z-dov i in-tov avtomob. prom-sti. Nr 3. Moscow, 1958, pp 50-53

ABSTRACT: Upon investigation it was established that the most acceptable technologically and also the most effective method of sulfiding high-speed steel tools and cast-iron, "crude", and improved machine parts at 500-600°C is the one using a solid mixture of (in %): FeS 94, graphite 3, and  $K_4Fe(CN)_6$  3. The method of sulfiding KhVG-steel 2M and 22Kh screw taps in a bath of the following composition (in %): KCNS 90,  $K_2AlSO_4$  24, and  $H_2O$  10, with working temperatures of 170-200° resulted in a substantial annual saving after introduction at the plant. It is pointed out that a new magnetic alloy of the ZhNA (Iron-Nickel-Aluminum) type was developed and introduced into industry. This alloy displays optimum magnetic properties directly after casting, without additional heat treatment, and permits a decrease in the Ni

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Sulfiding Process for Treatment of Tools and Parts

content from 0.5 to 1.5% in comparison with the alloy of the former composition.

A. B.

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AUTHOR: Cherkasov, B.A., Engineer

110-58-5-16/25

TITLE: The Use of Infra-red Rays for Drying Windings Impregnated with Insulating Varnish (Primeneniye infrakrasnykh luchey dlya sushki obmotok, propitannykh elektroizolyatsionnymi lakami)

PERIODICAL: Vestnik Elektropromyshlennosti, 1958, Vol 29, Nr 5, pp 47 - 50 (USSR).

ABSTRACT: In the Kuybyshev Automobile and Tractor Electrical Equipment Works the armatures of generators and starters used to be dried in electric convection ovens, where the heating was rather uneven. With the introduction of water emulsion lacquers it became difficult to dry armatures in the usual ovens. If the slightest trace of water is left in the insulation, the number of rejects is great. Experimental work on infra-red drying was commenced in 1953, using the laboratory apparatus illustrated in Figure 2. Armature temperatures were measured by thermocouples at various points. Figures 3 - 7 give test results obtained whilst studying the kinetics of heating armatures under various conditions of radiation by infra-red lamps. The armatures were from generators, type G-21. Figure 3 relates to the drying of

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The Use of Infra-red Rays for Drying Windings Impregnated with  
Insulating Varnish

armatures before impregnation whilst the remaining figures refer to armatures impregnated with water emulsion lacquer. An industrial installation for infra-red drying was then designed. When heated by two 250-W lamps from both sides or one 500 W lamp from one side, an unimpregnated armature of generator G-21 reaches a temperature of 120 - 125 °C in one hour, as against 6 - 8 hours in the old convection ovens (Figure 3). An impregnated armature reaches 120 - 125 °C in 75 - 80 min. (Figures 4 and 5). The best distance from the lamp to the armature surface is 10 - 20 mm. This small distance can be used because the armature is a good conductor of heat; for the same reason it can be dried from one side only. The rate of heating is closely dependent on the voltage applied to the lamps (Figure 6). If irradiation is continuous the temperature can reach 150 - 160 °C in 2 hours, which cannot be allowed. A graph of discontinuous radiation is given in Figure 7; in this schedule, when the armature has reached 120 - 125 °C, the lamps are switched off until the temperature falls to 110 - 115 °C. It takes 2 - 2 1/2 hours to dry an armature impregnated with

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The Use of Infra-red Rays for Drying Windings Impregnated with Insulating Varnish

water emulsion lacquer using one 500 W lamp as against 16 - 18 hours in the old ovens.

Three full-scale installations for drying armatures were put to work at the end of 1956. The equipment is illustrated in Figure 8 and is briefly described. Each installation is a closed chain conveyor; the armatures to be dried are mounted on special hooks. The conveyor speed is 6 - 8.5 cm/min; the size of the equipment is 340 x 170 x 665 cm, the output per shift is 550 - 600 armatures and the power consumption of each installation is about 38 kW. The armatures progress up from the loading point to the top of the oven in 60 - 75 minutes, being heated to 110 - 120 °C; they cool by 10 - 15 °C whilst passing over the top of the oven and in descending are heated to 120 - 130 °C. Then they cool by 10 - 20 °C and are again heated to 120 - 130 °C. On leaving this zone, they cool down to 40 - 50 °C before removal from the equipment.

The equipment has been very successful. Armature insulation resistance is very high and individual measurement has become unnecessary. Labour costs are less, power consumption is

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Insulating Varnish

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reduced by 20 - 30% and the drying time cut by a factor  
of 7 - 8.

There are 8 figures.

ASSOCIATION: Zavod "Katek", ("Katek" Works), Kuybyshev

SUBMITTED: July 15, 1957

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26(1)

PHASE I BOOK EXPLOITATION

SOV/2540

Cherkasov, Boris Aleksandrovich

Issledovaniye nagruzki stupeni gazovoy turbiny (Investigation of the Stage Load in Gas Turbines) Moscow, Oborongiz, 1959. 57 p.  
(Series: Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze. Trudy, vyp. 107) Errata slip inserted. 2,300 copies printed.

Ed.: A.S. Ginevskiy, Candidate of Technical Sciences; Ed. of Publishing House: A.P. Starykh; Tech. Ed.: N.A. Pukhlikova; Managing Ed.: A.S. Zaymovskaya, Engineer.

PURPOSE: This book is intended for scientific workers and engineers studying processes in aircraft gas turbines. It may also be recommended for use in courses on the theory and design of gas turbines.

COVERAGE: The author considers the influence of the load coefficient on flow parameters of a turbine stage. He shows that for each value of the load coefficient there is an optimum value of reaction.

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Investigation (Cont.)

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Experimental material on the investigation of cascades of vanes may be used in the analysis and design of high-load stages of transportation gas turbines and regulated stages of steam turbines. The author of the first part of the book, I.G. Rozanov, gives some of the possible values of the efficiency of the loaded stage at widely varying degrees of reaction and at a changing angle of flow at the outlet of nozzle. In the second part, written by B.A. Cherkasov, characteristics of blade cascades are given. These characteristics were established by Ye.V. S olokhina, B.K. D'yachenko, I.G. Rozanov, and others under the supervision of the author. There are no references.

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Investigation (Cont.)

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AUTHOR: Cherkasov, B.A.

TITLE: The Characteristic Radius and its Role in the Choice  
of the Parameters for Supersonic Gas Turbines<sub>13</sub>

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya  
tekhnika, 1959, Nr 4, pp 108-119 (USSR)

ABSTRACT: Suffices:

- o - Parameters at the entry into the turbine
- 1 - parameters in the axial clearance of the turbine
- 2 - parameters behind the turbine
- u - projection in the direction of the peripheral  
velocity,  
parameter of the peripheral velocity (index of  
the velocity coefficient)
- w - index of the relative motion
- x - at the characteristic radius
- cp - at the mean radius

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